Nederlandse Mededingingsautoriteit

BIJLAGE I BIJ METHODEBESLUIT

The cost of capital for electricity and gas networks: Issues raised during public consultation

June 2006

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Introduction

Several respondents, including PwC and Gupta Strategists, have submitted comments on the draft TenneT and regional electricity and gas networks Price Control consultation papers by DTe. This report provides Frontier's responses to the main comments related to the cost of capital calculation carried out by Frontier.

In addition to the discussion of individual issues in the following sections, we would stress that the cost of capital is only one element in the larger set of parameters which are established in the overall price determination, which influence network companies' financial positions over the price control period. Our estimated range for the cost of capital of the regional electricity companies and TenneT is based on a detailed analysis of a large set of available evidence, and we are confident that it provides a robust view of the expected returns of the financial markets generally and their electricity distribution and transmission segments in particular.

The rest of this report is structured as follows.

- Section 1 discusses issues related to the selection of the comparator sample.

- Section 2 discusses issues related to the methodology of calculating Beta.

- Section 3 discusses issues related to Equity Risk Premium.

- Section 4 discusses issues related to the risk-free rate, debt premium and inflation estimates used in the calculation of the cost of capital for regional companies.

- Finally, Section 5 provides Frontier view on comments raised with respect to discretional decisions by other regulators.

In addition, Annexe 1 contains analysis of individual potential comparators suggested in the consultation in addition to the current sample and Annexe 2 discusses other issues raised in the consultation with respect to individual comparators in the current sample.

1 Issues related to the comparator sample

This section sets out Frontier's response on the issues that have been raised in the consultation process regarding the choice of comparator companies for Beta estimation.

1.1   ANALYSIS OF ADDITIONAL COMPARATORS

DTe has asked Frontier to consider whether six additional comparators from those suggested by respondents in the consultation process satisfy the criteria for inclusion that Frontier applied to the existing sample of comparators.

We conduct this analysis in two parts:

- *first*, we analyse whether each individual potential additional comparator meets the criteria we applied to the existing sample; and

- *second*, for those potential additional comparators that do meet the criteria applied to the existing sample, we analyse whether it is desirable to add that comparator taking into account the need to have a balanced sample across different regulatory regimes and countries.

1.1.1   Analysis of individual potential comparators

As a first step in determining whether additional potential comparators suggested in the public consultation and presented to us by DTe could be added to the existing sample, we analysed each suggested company individually to see if it meets the criteria that we applied to selecting the current comparators. These criteria include:

- utility network operations should be large enough (for most companies in our sample, network activities comprise more than 70% of that company's total activities), and the remaining operations should also not have a very different risk profile – for example, they should be other utility operations such as regulated power generation, rather than risky financial investments;

- companies should be large enough to avoid the problem of infrequent trading of their shares (specifically, we used the cut-off of company total assets being EUR 100 million or more as an initial cross-check, and then for companies shortlisted for the sample we also measured the frequency of trading directly); and

- regulatory regimes in the respective countries should, taken over the sample as a whole, be representative of the regulatory regime in the Netherlands.

Our analysis of the suggested six potential comparators (summarised in Table 1 below and presented in more detail in Annexe 1) shows that all six companies meet the last two criteria. However, only two companies, Ameren and Wisconsin Energy, come close to meeting the first criterion: we estimate the

share of gas and electricity transmission/distribution networks in these two companies to be 60%.

In the next section we discuss whether it is worthwhile to actually add Ameren and Wisconsin Energy to the sample based on considerations of the overall sample composition.

Country	Company	Network share[1]	Other activities	Regulation	Turnover Mln USD	Assets Mln USD
USA	Ameren	60%	Regulated and non-regulated generation, power marketing and risk management	Rate of return	6,780	17,865
USA	Wisconsin Energy	60%	Regulated and non-regulated generation, recycling and renewable energy and real estate development	Rate of return	3,816	10,365
USA	Duke Energy (Cinergy)	40%	Regulated and non-regulated generation; upstream gas collection, marketing and supply; real estate development	Rate of return	5,410	17,154
USA	Dominion Resources	40%	Regulated and non-regulated generation; upstream gas and oil operations	Rate of return	18,041	52,400
USA	Pinnacle West	30%	Regulated generation; real estate; marketing and trading	Rate of return	2,988	11,323
USA	AEP	45%	Regulated and non-regulated generation	Rate of return	12,111	36,172

Table 1: Comparator characteristics
Source: Frontier calculations based on information from annual reports, financial statements, company websites.

1.1.2   Decision based on the overall sample composition

In the previous section we identified that two of the six potential additional comparators suggested in the consultation process could be considered for inclusion in the sample based on their individual characteristics.

In this section we also discuss whether it is indeed worthwhile to expand the sample.

As a first point, it should be noted that it was not our objective to include in the sample all possible companies around the world that meet the individual criteria for inclusion. Instead, we aimed to have a sufficiently large representative sample, consisting only of those companies that met the inclusion criteria best in terms of the share of network activities and absence of other activities, and provided a balanced coverage of different regulatory regimes that could be viewed as comparable to the one in the Netherlands.

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[1]   Numbers rounded to the nearest 5% to highlight the fact that these estimates should be treated only as approximate, due to data limitations and associated uncertainties.

In practice, this meant that we included in our sample *all* companies that we could identify as meeting the inclusion criteria from all comparable regulatory regimes/countries, with just one exception: the United States. The particular feature of the United States that makes it different from all other countries is that in the US there are dozens of companies fully or marginally meeting the inclusion criteria. Including all of these companies in the sample would make the results dominated by the particular features of both the regulatory regime and the market and operational risk conditions in the United States. We did not feel that such approach was appropriate for determining the cost of capital of regulated utilities in the Netherlands, and instead decided to go with the balanced sample approach. Even so, the current sample contains more companies from the US than from any other single country.

All companies suggested as potential additional comparators are also US companies, and so for the reason described above we do not recommend adding to the sample even those two of them that marginally meet the inclusion criteria (Ameren and Wisconsin Energy). We consider US companies already included in the sample to be broadly representative of all US companies potentially meeting the inclusion criteria – for example, Beta estimates for Ameren and Wisconsin Energy are not very different from Beta estimates for existing US comparators in the sample, and in fact are on the lower side of the existing sample (Annexe 1).

1.2   SHARE OF NETWORK ACTIVITIES

One of the criteria applied by Frontier in the selection of comparator companies for Beta estimation is that the share of utility network activities (transportation and/or distribution of gas, electricity and, in some cases, water) in such companies should be high (in practice, for most of the companies currently included in the sample this share is more than 70%). Frontier calculated shares of different activities in the companies' total operations using two methods:

- by some measure of income (net income, EBIT, operational income, gross margin – depending on data availability)[2]; and

- by assets.

In both cases, we looked at the average share over the last three years, apart from a small number of cases when data was available only for the last two years. Where data was available to calculate the shares based on both measures, we relied on the income measure as the primary estimate, but used the asset measure as a cross-check with the purpose of further investigation if the two measures were producing very different results. In practice, there was little need for such further investigation, because in the sample of shortlisted companies that we analysed the difference in estimates produced by the income measure and the asset measure was usually within 5-10% of each other.

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[2]   For the calculation of activity shares according to an income measure, we treated losses symmetrically with profits where applicable – i.e., included them in the calculation as absolute values (this applied only to a small number of cases and minor activities/small absolute amounts in those cases).

Issues related to the comparator sample

Preferred methodology for calculating activity shares

On theoretical grounds, the preferred methodology for calculating shares of different activities in the companies' total operations should be by using net income[34]. This is because equity betas, for the calculation of which comparators are ultimately selected, measure the correlation of company performance (i.e., the net income stream, present and expected, that it generates) with the performance of the overall market. When a company is engaged in more than one activity, correlation of income streams generated by different activities with the market may be different. In this case, the degree of overall correlation for the company will depend on the relative shares of income generated by each activity, which serve as weights for different degrees of correlation associated with the respective activities. Our objective is to establish the degree of correlation with the market for, say, electricity distribution and transportation (i.e., to calculate the equity beta for that activity), which means that in choosing comparators we need to look for companies in which the correlation of their total performance with the market is largely driven by the correlation with the market of their distribution or transmission business – in other words, companies in which the largest share of income is generated by this activity.

All other measures of relative shares of different activities, such as assets, EBIT, operating income, gross margin or revenue, are useful only to the extent that they can serve as a proxy to the shares of activities by net income, if direct information on the latter is not available.

All such intermediate measures essentially represent "income before some costs were subtracted", and the usefulness of a measure in each individual case depends on whether the costs embedded in the measure for each activity are in the same proportion to the final net income, or whether some activities require a disproportionately larger or smaller turnover to generate a given amount of net income than other activities.

For example, generally EBIT shares may be expected to be a good proxy for net income shares, because taxation rules are usually the same irrespectively of which activity generated pre-tax income, and company interest payments are usually also not linked to a particular activity.

On the other hand, measures which are closer to the gross revenue may be more distortionary, because they include the costs of sales which may differ substantially across different activities.

For example, in 2005 for Scottish Power the share of revenues attracted by its Infrastructure Division (SP segment operating electricity transmission and distribution networks in the UK) was only 6% of the Group's total revenues; however, this division generated 35% of the Group's total operating profits.

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3   One exception may be the case of a young rapidly growing company where the income measure may be less relevant for the overall company performance; however, this is not a concern for established companies such as the electricity and gas networks in the developed countries.

4   In practice, we use data for the last three years to avoid the possible effects of short-term volatility in the income measures.

Issues related to the comparator sample

Such large difference arises because the other UK segment of Scottish Power, called UK Division, is involved primarily in electricity generation & purchase and then supply to residential and other customers. This means that revenues of the UK Division, although very large in absolute terms (54% of the total Group revenue), also have large cost components embedded in them, related to the cost of generation and the cost of purchased energy. As a result, the share of operating profits generated by the UK Division is much smaller than its share of revenues, at only 15% of the total. This example illustrates that the revenue measure would be misleading to use in this case for analysing relative contributions of different activities to the company's stock performance.

If no income measures are available, we consider the asset measure more appropriate than the revenue measure. This is because asset values should be expected to be linked closely to the income streams that those assets are capable of generating. This point is confirmed in practice in our calculations: in most cases where both income and asset measures were available, activity shares calculated using each measure were within 5-10% of each other (while there were sometimes much larger discrepancies between the income and revenue measures, as the above example of Scottish Power illustrates).

Discrepancy in the share of transmission for Red Electrica

DTe has brought to our attention that for some companies the share of network activities calculated by Frontier has been significantly different from the share of network activities calculated by Gupta Strategists. In particular, this has been the case with Red Electrica, for which Frontier has indicated the share of electricity transmission at 100% of the company's total activities, while Gupta Strategists determined this share to be only 70% of the company's total activities.

Without access to the actual methodology applied by Gupta Strategists, we are not sure about the exact reason for this difference; but some possible issues that could lead to it include:

- treatment of system operator and other related functions – we did not consider such functions separately from the main electricity transmission business, while Gupta Strategists might have applied a different approach;

- treatment of telecoms – either the description of Red Electrica's activities on its own website (see Figure 1 below) or financial statement reporting by activity in its annual report[5] do not even mention that Red Electrica operates a telecommunication segment, although it is listed among its business activities in the descriptive part of the annual report. We interpreted this information to imply that the share of telecommunication operations in Red Electrica's total business is insignificant; however, Gupta Strategists' estimate might have been based on a different source; and

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[5]   Red Electrica de Espana, Annual Report 2004, p. 108-112

Issues related to the comparator sample

- difference in methodology - Frontier used the asset measure for activity shares in this case, given that we did not have access to an income measure, while Gupta Strategists might have used the revenue measure.

However, irrespectively of the exact reason for the discrepancy, both Frontier and Gupta Strategists' estimates imply that Red Electrica meets the criteria Frontier used for including comparators in the sample.

RED ELÉCTRICA was the first company in the world devoted exclusively to electricity transmission and operation … Since its creation in 1985, it has been responsible for the transmission network and for operation of the Spanish electricity system, ahead of recent trends worldwide towards the segregation of such activities, with transmission being seen as a separate activity from generation and distribution … As system operator, RED ELÉCTRICA guarantees a balance between energy production and consumption … The internationalisation strategy has led to the creation of Red Eléctrica Internacional, for the purpose of channelling and promoting the Group's business in foreign countries such as investment in transmission assets and advice and consultancy projects … RED ELÉCTRICA INTERNACIONAL focuses its investment activity on the purchase of companies and transmission assets, and on licences for transmission systems in which the company can offer its skills and experience.

Figure 1: Description of business activities of Red Electrica

Source: http://www.ree.es/ingles/i-index_quien.html, last time accessed on 28 April 2006

Issues related to the comparator sample

2 Methodology of calculating Beta

This section sets out Frontier's response on the issues that have been raised in the consultation process regarding the methodology of calculating Beta.

2.1   METHOD FOR CONVERSION OF ASSET BETA TO EQUITY BETA

The estimated Beta value of a comparator company's equity will depend upon the financial structure of that comparator. An increase in the level of gearing of a company will, other things being equal, increase the value of the equity Beta. The reason for this is that higher gearing increases the sensitivity of equity returns with respect to variations in the underlying profitability of the business.

The Beta estimate applied to the regional networks is based on Beta values for the group of comparator companies. The gearing levels of the comparator companies will not necessarily be equal to the gearing level applied to the regional networks. As a result it is necessary to adjust the Beta estimate to take account of any difference in gearing.

The approach used, which is a standard approach in regulatory decisions and the financial literature, is to convert the observed equity Betas into asset Betas. The asset Beta is the Beta that would apply in the situation of zero gearing and therefore reflects the underlying risk of the activity. The asset Beta estimate is then re-converted to an equity Beta based on the assumed gearing level for the regional network companies.

The financial literature has identified a number of formulas that can be used to convert equity Betas into asset Betas (and to reconvert asset Betas into equity Betas). A summary of these formulas is provided in a recent paper by Fernandez[6]. The different formulas have a lot in common but differ slightly in the treatment of two factors:

- the extent to which higher gearing results in an increase in the overall cost of capital as a result of increased default risk; and

- the most appropriate way to value the tax shield benefits accorded to debt interest, particularly in the context of a company that is growing over time.

The Fernandez paper concludes that the most appropriate formula for the conversion of equity Betas to asset Betas is:

$$\beta_{equity} = \beta_{asset} + (\beta_{asset} - \beta_{debt}) \times D \times (1\text{-}T) / E$$

Where D is the proportion of debt finance, E is the proportion of equity finance and T is the corporate tax rate. This formula is identical to the Modigliani-Miller

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[6]   Fernandez P, *Levered and unlevered Beta*, IESE Business School Research Paper, January 2003. The paper considers seven approaches including, Modigliani-Miller, Miles-Ezzell, Harris-Pringle, Myers and Damodaran.

formula in the situation where the company is assumed to be in steady-state. It is also the formula that Frontier used to convert Betas in the case of the regional networks with the assumption that the debt Beta is equal to zero[7]. The Fernandez paper concludes that other formulas, including the Miles-Ezzell formula, can give inconsistent results.

The Miles-Ezzell approach was based on the assumption that a firm wishes to keep a constant gearing ratio and that, in this case, the firm should be valued differently from a firm that has a preset level of debt. The assumption of a constant gearing ratio is a sensible proxy for the behaviour of a regulated network utility. However, the Fernandez paper concludes that the application of the Beta formula in Miles-Ezzell will give inconsistent results under different scenarios for the growth rate of the firm and the rate of corporate taxes[8].

It is also important to note that the differences between the formulas are only material in practice if there are significant differences between the gearing levels of comparator companies and the gearing level assumed for the regional networks. In this case the average gearing level for the comparator companies is somewhat below the 60% gearing assumed for the regional networks but the difference is not large.

2.2   PWC APPROACH TO CALCULATING BETA

DTe informed Frontier that, for calculating comparator betas, PwC suggested using a comparator group of a large number of companies, which share the characteristic that they are all regulated, but have different activities (airports, water companies, electricity production and sales). DTe requested Frontier to comment on this approach, and on how its results compare with the Frontier estimates.

Our assessment of the PwC approach is based on the document called "De vermogenskostenvoet van netbeheerders", PriceWaterhouseCoopers, December 2005. We understand from this document that PwC use a sample of 59 companies, and estimate raw and adjusted asset betas for individual companies using monthly data over 5 years, and weekly data over 2 years. As a second step, PwC run a regression on the 59 observations of individual company betas to control for different company characteristics, such as country, turnover, percentage of non-regulated revenues, types of regulated activities, and types of non-regulated activities.

In summary, our view is that in principle the approach taken by PwC is broadly equivalent to our own approach. In both cases, the final range for asset beta is estimated by taking an average of individual company betas across the relevant sample of companies. PwC achieves this using regression methodology, which

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[7]   The assumption that the debt Beta is zero does not mean that the default risk associated with higher levels of gearing is not taken into account. It is taken into account through the estimation of the appropriate debt premium.

[8]   Corporate tax rates in the Netherlands have changed in recent years and a further reduction is planned. Legislation is proposed that will reduce the main rate of corporate tax from 29.6% to 25.5% on 1 January 2007.

Methodology of calculating Beta

controls for non-relevant factors such as non-regulated activities. Frontier achieves this by controlling directly for the sample of relevant companies included in the list of comparators, and then taking simple summary measures across the sample.

Where the two approaches do differ, in our view, is in the potential risk that some important factor may not be taken into account appropriately. We believe that this risk is higher in the PwC approach, as explained below. We understand that this risk is probably not a big concern in the actual case at hand, because both Frontier and PwC arrive at approximately the same range for asset beta: 0.3 to 0.4 in the case of PwC, and 0.28 to 0.41 in the case of Frontier. Because of this close similarity in the actual results, our comments below should be taken as general cautionary points for the application of the approach taken by PwC, rather than a criticism of their actual estimation in this case (which we are not able to assess fully because we do not have access to some key intermediate inputs, in particular, individual company Betas and percentages of regulated activities for each company).

Approach to estimating asset Betas that was used by PwC, relying on a large sample of comparator companies combined with regression methodology, has the following potential risks that need to be taken into account properly in preparing intermediate inputs for such estimation.

- *Company betas may be imprecise.* To calculate individual company Betas, PwC use monthly data over 5 years, and weekly data over two years. Using such lower frequency data can lead to Beta estimates with low precision[9].

- *Company betas may be sensitive to the start date.* Beta estimates obtained using data frequencies lower than daily depend on the start date of the estimation[10], and this problem is especially serious when using monthly data.

- *Regression results depend on precision of activity shares.* PwC sample covers companies with very different activity mixes, from mostly unregulated to mostly regulated. Regression methodology can be used to estimate the correct

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[9] In the case of PwC, the number of data observations used to calculate betas is 60 for monthly data, and 105 for weekly data. Frontier calculates betas using weekly data over 5 years, and daily data over two years. In the first case, the number of observations is 260, in the second case it is 524. Given that PwC use about 5 times fewer observations than Frontier, this range of uncertainty in PwC estimates can be expected to be more than twice wider than in the Frontier estimates (the relationship is approximately proportionate to the square root of the number of observations). Generally, as we highlighted in our report, higher precision of beta estimates is a key reason for using higher frequency data in the estimation (daily or weekly). This is a recognised best practice; see for example, the recent report by Smithers and Co (Stephen Wright, Robin Mason and David Miles, *A study into certain aspects of the cost of capital for regulated utilities in the UK*, a report on behalf of Smithers & Co, 2003).

[10] In a simple example, sensitivity to the start date means that the value of a weekly or a monthly beta calculated starting with today's observation may be different from the value of a beta calculated starting with the observation yesterday. This happens because two different non-overlapping sets of observations are used in the two cases, although both cover the same overall time period. In our work, we deal with this problem in two ways: we use daily data, where this issue does not exist, and, in estimating betas with weekly data, for each company in the sample we take the average beta value across the five possible start dates.

Methodology of calculating Beta

Beta for regulated activities alone only if the share of regulated activities in each company was calculated correctly[11].

O *PwC approach does not distinguish between different regulated activities in the electricity sector, notably between generation and transmission/distribution.* This is potentially a major concern with the methodology employed by PwC, especially because almost 60% of their sample of comparators are US companies (which are typically vertically integrated, combining transmission/distribution with both regulated and non-regulated generation). Although both sectors are regulated, they are different activities with their own market and other risks. Separating the effects of the two activities to estimate the beta of transmission/distribution alone would require precise calculation of the respective shares of the two activities. This is an inherently difficult task, given limited availability of the necessary data. Frontier dealt with this problem by carefully selecting a sample of comparators all of which have predominantly network activities. PwC, on the other hand, have not dealt with this issue at all – effectively, they simply implicitly assumed that the beta of regulated generation is the same as the beta of regulated transmission or distribution, without providing any justification for this assumption.

The importance of this point becomes even more evident when we consider that some respondents in the consultation process have discussed in detail even a much finer distinction, between transmission and distribution activities (see Section 2.3 below).

2.3 TRANSMISSION VS DISTRIBUTION COMPANIES

Some regional distribution companies claim that the Beta is underestimated due to the fact that there are some electricity transmission companies included in the comparator group.

Some of the companies in comparator group have electricity transmission activities. We do not consider that this invalidates their inclusion in the comparator group.

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[11] In particular, as we illustrated in Section 1.2 of this report, one problem with estimating activity shares can arise from using revenue as a measure (which was the measure used by PwC).

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Company	Electricity transmission share	Asset Beta – daily data	Asset Beta – weekly data
Canadian Utilities	10%	0.29	0.26
Transener	100%	0.24	0.32
Emera	15%	0.13	0.11
Red Electrica	100%	0.36	0.21
Transco	25%	0.38	0.31
Scottish Power	25%	0.42	0.43
Viridian	5%	0.39	0.15
Duquesne Light Holdings	10%	0.68	0.38
Total sample[12]		**0.39**	**0.28**

Table 2: Asset Betas for comparator firms – daily and weekly data

Source: Frontier calculations

Table 2 above shows the asset Beta values for the comparators that have electricity transmission activities. There is no evidence from these results to suggest that the inclusion of companies with a significant share of electricity transmission results in downward bias to the Beta estimates. The average Beta for the four comparators with a share of transmission that is 25% or higher lies in the range 0.27 to 0.36.

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[12]   Calculated as sample medians

Methodology of calculating Beta

3 Equity risk premium

This section sets out Frontier's response on the issues that have been raised in the consultation process regarding the equity risk premium estimates that were used in the calculation of the cost of capital for the regional networks.

3.1   HISTORIC RETURNS VS. ERP+RFR

Some respondents are of the view that market return is more stable, and so should be used instead of risk free rate plus ERP to determine the cost of equity.

This comment is based on evidence that historic returns may indeed be more stable than either the historic risk free rate or historic equity risk premium taken separately. The conclusion would thus be valid if the Frontier analysis only relied on historic data in reaching its assessment. However, this is clearly not the case.

○ To assess the equity risk premium the Frontier analysis took account of:

- historical data;

- various proposed adjustments to historical data;

- survey evidence; and

- recent market evidence.

○ To assess the risk-free rate we had to consider which time period would provide the right balance between using unbiased current market data and ensuring that the results are not distorted by any short-term volatility.

The objective in each case was to produce an estimate that was appropriate for establishing the forward-looking cost of equity. In this case estimating the parameters separately does not introduce any bias. The methodology of separate estimation of the two parameters is also well-established and is widely used by different regulators.

3.2   EX-ANTE VS EX-POST ESTIMATES OF ERP

To determine the ERP Gupta strategists only take ex-ante predictions into account while PwC (when determining the return on equity) only looks at ex-post figures during the period 1950-1990 and 1950-2000.

We are of the view that both ex-post as well as ex-ante data should be used to determine the ERP. This is because both types of estimates contain information that may be valuable for predicting what the actual ERP may be in the medium-term future, and so should be taken into account. Ex-ante predictions are valuable because they may be capturing important expected changes to the market environment, which were not observed in the past. On the other hand, estimates of the historical ERP are equally valuable for identifying a plausible forward-looking risk premium, because they explicitly incorporate, in the actual observed data, *all* factors that are influencing the ERP. As most of these (for example, investor risk aversion, liquidity of the financial markets, quality of

regulation information availability and output volatility) will be relatively stable over the mid-term period of several years, they are likely to be the dominant determinants of the forward-looking ERP. However, at least some ex-ante methods (such as, for example, investor surveys) may be less well positioned for capturing the combined effect of all such long-run historical factors appropriately, exactly because they are not based on hard data evidence.

In determining an estimate of the historical equity risk premium, it is appropriate to look at a long time period and also across a number of different countries. We use the period starting from 1900, which is the earliest point from which robust and consistent dataset of international equity returns exists (see Dimson, Marsh and Staunton[13]). The reason for taking a long time horizon is that equity returns exhibit high volatility in the short-term. This volatility can distort measures of equity returns even when measured over decades. As a result, estimates based on shorter periods of time (which should, in principle, reflect trends in the underlying drivers of equity returns) are unduly influenced by cyclical fluctuations in stock market returns.

It should be recognised that neither approach is ideal because of this inherent trade-off between taking proper account of the underlying key drivers of the ERP and capturing possible more recent changes in them, but relying on the longest period of available historical data and combining such historical estimates with the current ex-ante views of the ERP is the best solution available in practice.

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[13]   Elroy Dimson, Paul Marsh and Mike Staunton. 2005. *Global Investment Returns Yearbook 2005* and previous editions.

4 Risk free rate, debt premium and inflation

This section sets out Frontier's response on the issues that have been raised in the consultation process regarding the risk free rate, debt premium and inflation estimates that were used in the calculation of the cost of capital for the regional networks.

4.1 THE ESTIMATE OF THE DEBT PREMIUM

Some respondents in the public consultation have commented that the estimate of the debt premium that Frontier/DTe use may be too high. This evidence has been based on the debt premiums for Eneco, Nuon and Essent, as well as the SGIB/Bloomberg electricity and gas index.

We do recognise that the debt premium over the last 2 to 5 years for some companies in our sample of comparators for debt premium estimation has been lower than the final estimate that we use (0.8%). For example, for Essent and Eneco it has been around 0.5%. In addition, the debt premium based on the median of the comparator group, in the two years to the end of 2005, has been 52 basis points. Based on this evidence, and the yield data on single A bonds over the last 5 year, a case could be made for a debt premium range of 60 to 80 basis points (i.e. 0.6% to 0.8%).

However, there have also been a number of companies for which the historical debt premium over the same time span has been higher than 0.8%, and the average debt premium across our full sample of comparators ranges from 0.6% to 0.7% depending on the time period. In addition, it should be noted that our final estimate of the debt premium includes an implicit allowance for debt issuance transaction costs. Finally, it should be also remembered that there is intrinsic uncertainty in any such estimates which was so much stressed in the comments of other respondents. In summary, we are confident that our estimate of the debt premium of 0.8% provides a balanced combined view of all available evidence and the relevant considerations.

Risk free rate, debt premium and inflation

4.2   REFERENCE PERIOD FOR THE RISK FREE RATE

There has been some additional debate about the reference period to determine the risk free rate. PwC view is that one should use the 10 year reference period to take into account the fact that companies cannot refinance all their debt and the fact that current risk free rate is very low and volatile. Gupta Strategists, on the other hand, are of the view that the duration of the loans is only a few years. Furthermore, the companies are saying that the 2-5 year period focuses on an historical low period of interest rates.

There are strong theoretical reasons to use the most recent data in estimating forward-looking risk-free rate. A recent comprehensive study of best-practice principles in estimating regulatory cost of capital carried out by Smithers & Co.[14] finds that there does not appear to exist such thing as a stable long-run value of the risk-free rate:

> "The range of mean real returns on short-term bills over the twentieth century is actually wider that the range of equity returns over the same set of countries, with a number of countries having experienced negative real interest rates"[15].

In this situation, the authors of the study conclude that the best estimate of a forward-looking risk-free rate will come from its current/most recent historic values:

> "In the absence of clear evidence of a stable mean over long samples, there may be better arguments for a forward-looking approach in setting the risk-free rate. This approach is aided … by the fact that at least current values of the risk-free rate can be observed directly from the data"[16]. "Problems in assessing historic mean values of the safe rate imply that estimates of the future safe short-term rate …should probably be derived in a forward-looking way from current rates"[17].

Such approach is intuitively clear. We agree with the authors of the Smithers & Co. study that the best approach to estimating the risk-free rate in this situation is to place more weight on the more recent data, as the best indicator of what the market conditions may be looking forward.

Of course, due to very short-term volatility in practice a range of recent data is used, rather than just a single number on a specified date. We obtain our estimate of the risk free rate using an average over a 2 and 5 year period, which provides ample protection against short-term volatility.

As a practical example, we would also like to point out that the view that "the 2-5 year period focuses on an historical low period of interest rates" is factually incorrect – this period had relatively low interest rates *only* in comparison to the

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[14]   Wright, Stephen, Robin Mason and David Miles. 2003. *A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the U.K.* On behalf of Smithers & Co Ltd (referred to further in this report as "Smithers & Co").

[15]   Smithers & Co., p. 41.

[16]   Smithers & Co., p. 41-42.

[17]   Smithers & Co., p. 49.

more recent historical period up to the 1980s, which from another perspective can also be described as a period of "historically high interest rates". Interest rates over the last 2-5 years are, however, far from absolute historical minimums of real risk free rates, which have, at times, been negative. For example, Table 3 below shows that in the 10-year period of the lowest bond returns in the Netherlands over the last century, annual real interest rate was as low as -7.2%.

Risk-free rate	Mean return, % pa[18]	Lowest 10-year return, % pa	Highest 10-year return, % pa
Nominal	4.3 (4.6)	-0.9	10.1
Real	1.3 (1.7)	-7.2	7.8

Table 3: Returns on Dutch bonds, 1900-2004

Source: Dimson, Marsh and Staunton (2005)[19]

From this perspective and given the range of currently available evidence it is also far from certain that "the only way for the interest rates to move from their current levels is up". In fact, as shown by the evidence that we used, there are good reasons to believe that the interest rates may actually stay around their current levels in the medium-term future, and this is reflected in our estimates of the RFR[20].

Even more importantly, if a regulator applies any given approach consistently in each price control review, the companies will be able to match their financing decisions to this methodology. In the long-term, it does not make sense for the regulator to switch to a less appropriate methodology simply because the companies' existing financing arrangements were not in line with the regulator's approach.

It should be recognised that there may be a transitional period while companies move from an old financing structure to the one that corresponds to the parameter estimation principles used by the regulator. However, if the regulator decides that it is necessary to make an adjustment to the price control (upwards or downwards) for such transitional period, it is better to do so as a separate exercise rather than by changing the core methodology. Any decisions to make transitional adjustments would need to be made on an understanding of the magnitude of the impact and taking into account the wider context of the regulatory settlement. The regulator would also want to consider whether any

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[18]   The first number is geometric mean, the second number (in parentheses) is arithmetic mean.

[19]   Dimson, Marsh and Staunton, Global Investment Returns Yearbook, 2005.

[20]   It is important to distinguish between changes in nominal and real interest rates. When market observers discuss the likelihood of a rate rise by a central bank, in many cases their main reason for expecting such change is an anticipated rise in inflationary pressures in the economy. However, a simultaneous increase of the same magnitude in nominal interest rates and inflation *leaves real interest rates unchanged.*

Risk free rate, debt premium and inflation

transitional adjustments would impact the incentives on companies to act in an efficient way in the future.

4.3 ILLIQUIDITY AND SMALL FIRM PREMIA

The question has been raised as to whether it is appropriate to make an adjustment to the cost of capital to reflect (a) illiquidity as a result of public ownership, (b) the small size of some of the utilities and (c) specific risk factors.

In principle, there is a single efficient cost of capital for investment in a particular industry or activity. This cost of capital represents the opportunity cost of finance and reflects the risk characteristics of the industry. The price setting methodology applied by DTe is to base cost allowances (including the allowance for the cost of capital) upon an assessment of efficient costs. This approach means that prices will be set at an appropriate level that sends the correct price signals for consumption and investment decisions.

In practice, it is possible that the cost of capital for different companies within the same industry could differ from the efficient level. Potential reasons for a cost of capital that is higher than the efficient opportunity cost for that capital include: sub-optimal capital structure; differences in ownership structure; and differences in the size of the company.

For the reasons described below, the approach adopted by DTe is to not reflect any differences of this nature between companies when estimating the cost of capital. This approach, by not compensating any inefficient financial structures, provides the correct incentives upon the companies to adopt efficient financing decisions.

4.3.1 Public sector ownership

It can be argued that public sector ownership could affect the cost of finance for a utility. It can be argued that public sector ownership could result in a lower cost of finance since the utility would have access to funds at the low borrowing rates that can be achieved by central or municipal governments. Conversely it can be argued that public sector ownership could result in a higher cost of capital because the utility may not have access to capital markets in the same way that a privately-held company would.

The disadvantage of applying a lower cost of capital to publicly owned utilities is that the lower cost of finance is the result of a transfer of risk from customers to taxpayers[21].

The approach adopted by DTe is to apply the same cost of capital regardless of the ownership structure. By setting the cost of capital at the efficient level a regulator will ensure that companies are not compensated for an inefficient financing structure. In this regard, there are a number of examples where

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[21] The low borrowing costs that governments can achieved are dependent on the fact that governments can raise tax revenues to cover the interest payments. This is why government debt yields are typically used to proxy the risk-free rate.

regulators have applied the standard CAPM approach to utilities owned by the government or by local municipalities[22].

4.3.2 Small company premium

There is evidence that there are some economies of scope associated with raising debt and equity finance. In other words, the relative cost of raising finance reduces as the amount of finance being raised increases. For this reason some regulators have allowed smaller utilities a premium to the cost of capital on the basis that smaller utilities are likely to raise smaller amounts of finance than larger utilities and therefore are likely to face proportionately higher issuance costs.

However, it should also be noted that the exact magnitude of this effect is difficult to quantify, and different regulators approach this issue differently. One reason for this is that a regulated company, however small, could avoid these higher costs by becoming part of a larger holding company (essentially taking advantage of the existence of economies of scope). As a result, the regulator could decide to take account of the size of the regulated activity, the size of the holding company, or simply assume that companies will choose an ownership structure that results in the most efficient level of costs.

A second reason is that financial markets are becoming increasing innovative in developing financial products that allow smaller firms to access more forms of finance. It has traditionally been the case that corporate bond markets were not open to smaller firms (e.g. debt issues much smaller than 100 million Euros were difficult or not commercially viable). In the UK the Royal Bank of Scotland (RBS) created a vehicle (Artesian Finance) that raised debt on the corporate bond markets with the express purpose of allocating the funds in smaller tranches to small water utilities. This suggests that opportunities for arbitrage will put downward pressure on the costs of raising finance for small firms.

In some cases where regulators have applied a small company premium to the cost of capital it is partly because the regulatory or legislative environment makes it difficult for small companies to merge to take advantage of any economies of scope in raising finance. This is the case in the water industry in England and Wales where there is a requirement to maintain a sufficient number of comparator firms within the industry.

4.3.3 Specific risk factors

In the assessment of the cost of capital for the regional network we considered the impact of specific structural changes in the industry that could impact on the cost of capital. These were the unbundling of supply and production activities and the transfer of responsibility for high voltage networks. Our assessment concluded that these specific factors would not increase the systematic risk of the

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[22] In addition to DTe's decisions for TenneT and the regional networks, other examples of regulators using the CAPM for publicly owned companies include CER's regulation of the gas transmission company in Ireland, the CAA's regulation of Manchester Airport and E-Control's regulation of the gas transportation companies in Austria.

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regulated regional networks activities and that the Beta estimates from the comparator companies would remain valid.

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5 Treatment of uncertainty

This section sets out Frontier's response on the issues that have been raised in the consultation process regarding the treatment of uncertainty in estimating cost of capital.

5.1 DISCRETIONARY DECISIONS BY OTHER REGULATORS

PwC has argued that foreign regulators (e.g. Ofgem/Ofwat) have noted a recent decline in measured betas. One explanation for this could be, that the underlying risks have declined, but there may also be other reasons for this. For example, PwC noted that there have been divergences between empirically estimated betas and betas actually used in COC determinations.

Another comment received in the consultation process was that DTe needs to take the level of uncertainty more into account. The companies referred to low current interest rates, and uncertainty about the beta (see decisions by Ofgem etc.).

It is true that there is intrinsic uncertainty in all estimates of the expected cost of capital over the next several years, because these estimates are based on the historical parameters, which are only proxies for what can be expected in the future. We take account of this potential uncertainty in a number of different ways.

- By considering a wide range of evidence for all of the parameters. For example, by considering Beta estimates for a range of comparable companies over a range of periods and estimation methods we have aimed to minimise the uncertainty associated with Beta estimates.

- By taking account, where appropriate, of medium and long-term trends as well as the latest information. This should ensure that our estimates are not distorted by short-term volatility in financial markets.

- By taking account of possible correlations between the parameters in the cost of capital calculation. For example, under certain circumstances a decline in the risk-free rate could be associated with an increase in the equity risk premium and the debt premium. We have considered the potential significance of these correlations in deciding how much reliance to place on current market data.

- By estimating a range for the expected WACC based on two consistent scenarios reflecting the estimated ranges for the underlying individual parameters.

These steps have been taken to minimise the uncertainty in the estimates of the cost of capital. To the extent that there remains some uncertainty this is reflected in adopting a degree of caution with respect to some of the key parameters. A key example is the choice of an inflation projection that lies towards the bottom-end of the range indicated by the available evidence. This takes appropriate consideration of concerns that nominal interest rates are at an historic low.

Annexe 1: Analysis of individual potential comparators

In the first part of this Annexe we analyse whether each individual additional comparator (all of which are US companies) meets the criteria that we applied to the comparators in the existing sample. A summary of this analysis is presented in Table 1 in Section 1.1.2 of the main report.

In the second part of the Annexe we compare Beta estimates from the additional potential comparators that marginally meet the inclusion criteria with the Beta estimates from the US companies already in our sample.

INDIVIDUAL CRITERIA FOR INCLUSION

Ameren

Ameren Corporation is a US company whose principal activity is the generation, transmission and distribution of electricity and natural gas to residential, commercial, industrial and wholesale users in the Central United States.

The company has six main subsidiaries, four of which are subject to rate of return regulation on most of their revenues: Union Electric Company, Central Illinois Public Service Company, Central Illinois Lighting Company, and Illinois Power Company. The other two subsidiaries (Ameren Energy Generating Company and CILCORP Inc excluding CILCO) operate non-regulated power generation and carry out some other small non-regulated activities.

Based on information for each individual subsidiary, the share of regulated business in Ameren's operations on average over the last three years (2005-2003) was:

- 84% if measured by net income; and
- 79% if measured by assets.

However, a substantial part of the total operations of the Ameren's largest subsidiary, Union Electric Company, is regulated power-generation. UE accounts do not provide any quantitative information that would allow assessing the relative size of power generation vs. power transmission and distribution, but the annual report does mention that Ameren has sufficient own generating capacity to produce all energy it requires to supply to its customers. Based on information for other vertically integrated generating companies internationally for which the breakdown of different types of assets is available, we make an assumption that the share of generating assets in the UE total electricity operations (i.e., excluding gas distribution) is 50%.

Based on this assumption, which is to a large extent arbitrary but at the same time can actually be a conservative estimate of the share of generation, the estimated share of gas and electricity networks in Ameren's total operations on average over the last three years (2005-2003) was:

- 59% if measured by net income; and

- 60% if measured by assets.

The distinction between the share of networks and the share of all regulated activities is important, because, although the regulatory regime applying to electricity generation and transmission/distribution may be similar, operational and other market risks faced by these two segments may be different (and higher for generation, e.g. the operational risk of nuclear generating units).

In summary, given the unavoidable uncertainties around these estimates, we conclude that Ameren almost meets the main criterion we applied to companies in the existing sample of comparators.

Wisconsin Energy

The Group's principal activities are generation of electricity, distribution of water, gas, steam and electricity and other non-utility businesses. It operates through two segments, Utility Energy and Non-Utility Energy. The Utility segment serves more than 1.1 million electric customers in Wisconsin and Michigan's Upper Peninsula and more than one million natural gas customers in Wisconsin. These services are provided under the trade name We Energies and through Edison Sault Electric Company. The Non-utility businesses include recycling and renewable energy and real estate development.

Based on information for each individual subsidiary, the share of regulated business in Wisconsin Energy's operations on average over the last three years (2003-2005) was:

- 95% if measured by operating income; and

- 89% if measured by assets.

However, similarly to Ameren considered above, Wisconsin Energy is a vertically integrated company, and its regulated electricity business includes substantial component of energy generation. Although the regulatory regime applying to electricity generation and transmission/distribution may be similar, operational and other market risks faced by the two segments may be different. For the purposes of our study, it is important to determine the share of networks alone in the total company. Again, as with Ameren, information about asset split between generation and transmission/distribution is not available for Wisconsin Energy, and we use the assumption of 50%/50% split. This assumption is applied to 68% of Utility Energy income or assets, because approximately 20% of the Utility Energy's gross margin is derived from gas operations, and of the remaining 80% approximately 16% fall onto purchased energy (all estimates are average over the last three years).

Based on these assumptions, the estimated share of gas and electricity networks in Wisconsin Energy's total operations on average over the last three years (2005-2003) was:

- 63% if measured by operating income; and

Annexe 1: Analysis of individual potential comparators

- 59% if measured by assets.

In summary, similarly to Ameren, we conclude that Wisconsin Energy almost meets the main criterion that we applied to companies in the existing sample of comparators.

Cinergy Corporation (Duke Energy Corporation)

Cinergy Corporation is now the Duke Energy Corporation. The group's principal activities are to produce, transmit, distribute, sell and transport electric energy and natural gas. It operates through three segments:

- Commercial segment;

- Regulated segment; and

- Power Technology and Infrastructure segment.

Commercial segment manages wholesale generation, marketing and trading of energy commodities, operates and maintains electric generating plants. Regulated segment consists of PSI Energy Inc.'s regulated generation and transmission and distribution operations and The Cincinnati Gas and Electric Company and its subsidiaries' regulated electric and gas transmission and distribution systems. Power Technology and Infrastructure manages the development, marketing and sale of retail energy and related businesses. It also manages its investments in other energy infrastructure and telecommunication service providers. The Group provides service in the southwestern portion of Ohio, Kentucky and Indiana.

In addition, the Group has the International Energy segment, engaged in energy production and marketing in Latin America and Saudi Arabia. Operations of International Energy are not regulated.

The Group also operates a real estate development subsidiary Crescent.

Based on information for each individual subsidiary, the share of regulated business in Duke Energy's operations on average over the last three years (2005-2003) was:

- 55% if measured by EBIT; and

- 67% if measured by assets.

Taking into account that Franchised Electric, the Group's regulated energy subsidiary, has a large portfolio of nuclear and other generating assets and applying the same assumption of 50%/50% split between generation and transmission/distribution as before, the estimated share of gas and electricity networks in Duke Energy's total operations on average over the last three years (2005-2003) was:

- 41% if measured by EBIT; and

- 50% if measured by assets.

In summary, we conclude that Duke Energy does not meet the main criterion that we applied to companies in the existing sample of comparators: its share of

Annexe 1: Analysis of individual potential comparators

network activities is smaller than the approximate target of 70% or more that we used.

Dominion Resources

The Group's principal activities are to generate, transmit, distribute and sell gas and electric energy. The Group's activities are carried out through four segments: Generation operations, Energy, Delivery and Exploration and Production Services. Generation segment includes the operations of electric utility and merchant fleet. Energy segment consists of electric transmission, natural gas transmission pipeline and storage businesses, certain natural gas production, as well as Clearinghouse and field services operations. Delivery segment includes electric and gas distribution systems, customer service operations and retail energy marketing operations. Exploration and production services segment manages the Group's onshore and offshore gas and oil exploration, development and production operations.

Based on information for each individual subsidiary, the share of regulated business in Dominion's operations (on average over the last three years for income and last two years for assets) was:

- 59% if measured by net income; and

- 61% if measured by assets.

The share of network operations alone (i.e., not including the utility generation fleet[23]) in the total operations of Dominion resources was:

- 42% if measured by net income; and

- 33% if measured by assets.

In summary, we conclude that Dominion Resources does not meet the main criterion that we applied to companies in the existing sample of comparators: its share of network activities smaller than the approximate target of 70% or more that we used.

Pinnacle West

The Group's principal activities are to provide retail or wholesale electric services through its subsidiaries. The Group operates through three business segments: Regulated electricity, Marketing and trading and Real estate. Regulated electricity consists of regulated retail and wholesale electricity businesses and electricity transmission, distribution and generation. Marketing and Trading segment consists of competitive business activities, including wholesale marketing and trading and APS Energy Services and commodity-related energy services. Real estate segment consists of SunCor's real estate development and investment activities.

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23   Both income and asset data was available separately for the Dominion's generation and other segments, so no assumptions about the share of generation were required.

Annexe 1: Analysis of individual potential comparators

Based on information for each individual subsidiary, the estimated share of regulated business in the operations of Pinnacle West (on average over the last three years for income and last two years for assets) was:

- 64% if measured by net income; and

- 87% if measured by assets.

The estimated share of network operations alone (i.e., not including generation, assumed at 50% of total utility) in the total operations of Dominion resources was:

- 32% if measured by net income; and

- 44% if measured by assets.

American Electric Power

The Group's principal activities include generation, transmission and distribution of electric power. This includes supplying and marketing of electric power at wholesale (through the electric generation function) to other electric utility companies, municipalities and other market participants.

The activities of the Group are conducted through the 11 operating subsidiaries. The generating and transmission facilities of all the subsidiaries are physically interconnected and their operations are coordinated as a single electric utility system. Transmission networks are interconnected with extensive distribution facility in the territories served. The Group provides services in Arkansas, Indiana, Kentucky, Louisiana, Michigan, Ohio, Oklahoma, Tennessee, Texas, Virginia and West Virginia.

The Group has operations in Brazil, Mexico, the United Kingdom and Australia.

During the year 2005, the Group sold a 98% controlling interest in Houston Pipe Line Company. On 28-Sep-2005, the Group acquired Waterford Energy Center.

The Group also owns underdeveloped and formerly operated coal properties and related facilities, as well as barge, rail other fuel transportation related assets.

Calculation of activity shares

Data available to us for AEP did not allow calculating activity shares based on income measures, but it contained sufficient information to calculate the share of network activities based on asset split. Because data on assets was available separately for generation, transmission and distribution, it did not require additional assumptions. Finally, we did not have sufficient information to also calculate the share of regulated activities as was done for other companies above. This is because AEP's power generation fleet contains both regulated and non-regulated (merchant) assets, and information was not available on their respective shares.

The estimated share of network operations alone (i.e., not including power generation and non-utility operations) in the total operations of AEP was 46% measured by assets (average over the last two years).

Annexe 1: Analysis of individual potential comparators

COMPARISON OF BETA ESTIMATES

Table 4 compares Beta estimates from the additional potential comparators that marginally meet the inclusion criteria (Ameren and Wisconsin Energy) with the Beta estimates from the US companies already in our sample.

The table shows that Beta estimates for Ameren and Wisconsin Energy are broadly in line with the Beta estimates for the existing US comparators, and in fact are on the lower side of the existing sample.

The table also shows Betas of the other US companies that were suggested in the consultation process as potential comparators. Comparing the results for these companies with the betas of existing US comparators, we note that the average beta of US comparators already included in the comparator group (0.62 daily, 0.38 weekly) is somewhat higher than the average beta of the sample including additional suggested US comparators (0.53 daily, 0.41 weekly), but the difference is small and the betas of US comparators included in the comparator group seem to be representative for all US comparators.

Country	Company	Daily data	Weekly data
USA	Atlanta Gas Light	0.57	0.43
USA	Atmos Energy	0.58	0.36
USA	Duquesne Light Holdings	0.68	0.38
USA	Exelon	0.65	0.34
USA	Ameren	0.49	0.27
USA	Wisconsin Energy	0.47	0.35
USA	American Electric Power	0.51	0.54
USA	Duke Energy (Cinergy)	0.58	0.69
USA	Dominion Resources	0.49	0.39
USA	Pinnacle West	0.47	0.47
USA	Northeast Utilities	0.34	0.26
USA	Pepco Holdings	0.48	0.29
USA	PNM Resources	0.63	0.46
USA	Teco Energy	0.53	0.46

Table 4: Asset betas for comparator firms and suggested additional comparators, Vasicek adjustment

Source: Frontier calculations

Daily data over two years from 29 Dec 2003 to 29 Dec 2005, weekly data over five years from 02 Jan 2001 to 26-30 Dec 2005 (average across 5 possible start days); national indexes.

Annexe 1: Analysis of individual potential comparators

Annexe 2: Analysis of comparators discussed by the respondents

Some respondents in the consultation process raised questions about the validity of four comparator companies in our existing sample, for different specific reasons. This Annexe reviews these questions.

Atmos

A question has been raised about the validity of Atmos as a comparator in our sample in the view of its acquisition of TXU at the end of 2004.

Atmos Energy, a comparator for gas distribution activity in our sample, purchased TXU Gas in October 2004. The Group's principal activities are to distribute and sell utility natural gas and non-utility natural gas. It operates through its four segments. The utility segment includes natural gas distribution and sales operations. Natural gas marketing segment includes natural gas management services. Other non-utility segment includes storage services and electric power plant construction and leasing services. Pipeline and Storage Segment interconnects natural gas transmission lines, underground storage Reservoirs, compressor stations and related properties. The Group provides natural gas storage services, energy management and gas marketing services and electrical power generation to meet peak load demands for a municipality. The Group serves industrial customers, municipalities and other local distribution companies. The Group operates solely in the domestic market.

Using data from the 2005 company report, we cross-checked how the purchase of TXU Gas affected activity shares in the company.

We find that network activities (gas transmission and distribution) comprised the following shares of the total company activities:

- by net income – 82%;

- by assets – 82%.

This compares with the share of network activities of 75% that we had estimated for Atmos previously based on three years of data from 2004 to 2002. In other words, we find that the share of network activities in the Atmos operations *increased* after the purchase of TXU Gas. This is not surprising given that TXU Gas is primarily a gas distribution company.

We conclude that Atmos Energy became a better comparator after the acquisition of TXU Gas, because the share of network activities in the combined company further increased.

United Utilities

A question has been raised about the validity of United Utilities as a comparator in our sample in the view of a significant share of water distribution in the company's total activities.

Water distribution is a regulated network activity with a similar risk profile and regulatory regime to those in energy network activities, such as electricity or gas distribution. Given that United Utilities also has a significant share of electricity distribution, we consider it a good comparator fully meeting our general criteria for sample selection.

Viridian

A question has been raised about the validity of Viridian as a comparator in our sample in the view of [perceived by the respondent] intransparency of this company, and a large number of different activities that this company is engaged in (examples given included system operation and DC transmission).

Viridian Group's principal activity is supplying electricity from power purchasing board in order to supply customers who are either not yet eligible for competition or who are eligible but have not moved to a second tier supplier. The Group is also responsible for the billing and collection of customer accounts. The Group also operates as an integrated energy business comprising generation, through Huntstown 1 in the Republic of Ireland, together with competitive supply, through Energia, in both Northern Ireland and the Republic of Ireland. The Group also provides unregulated power utility contractor specialising in the design, construction, commissioning and maintenance of high voltage transmission and distribution power systems, for electricity companies and industrial customers. The Group operates in the United Kingdom, the Republic of Ireland and the Isle of Man.

DC (direct current) transmission is a type of electricity transmission line, the other type being AC (alternating current). We are not clear why involvement in DC electricity transmission is considered by the respondent to be a reason for excluding the company from our sample of comparators.

Similarly, system operation is usually part of the functions of the main electricity/gas distribution in a given country, and we did not exclude companies from our sample for being engaged in system operation.

According to our estimates carried out at the time of sample selection, Viridian has 70% of network activities, and as such meets the criteria that we applied to all companies in the sample in this regard.

AGL Resources

A question has been raised about the validity of AGL Resources as a comparator in our sample, because the company has recently changed its business profile.

AGL Resources' principal activity is to distribute natural gas in Florida, Georgia, Maryland, New Jersey, Tennessee and Virginia. It conducts the operations through its subsidiaries or affiliated companies. The Group operates in three segments: Distribution Operations, Energy Investments and Wholesale Services. The Distribution Operation segment serves approximately 2.2 million end-use customers. The Energy Investments segment includes retail natural gas and propane marketing and operating telecommunications conduit and fibre infrastructure within select metropolitan areas. The Wholesale Services segment

Annexe 2: Analysis of comparators discussed by the respondents

includes natural gas asset optimization, transportation, storage and wholesale marketing. It also includes producer and peaking services. The Group distributes natural gas to residential, commercial and industrial customers.

Using data from the 2005 company report, we cross-checked how any recent changes in the business profile of the company might have affected the composition of its activity shares.

We find that network activities (gas transmission and distribution) comprised the following shares of the total company activities:

- by EBIT – 70%;

- by assets – 90%.

This compares with the share of network activities of 80% that we had estimated for AGL Resources previously based on three years of data from 2004 to 2002. Although the share of network activities by income has declined somewhat in 2005 compared to our previous estimate (whether due to a short-term income fluctuation or any more lasting changes in the business structure), AGL Resources still meets the criteria we applied in selecting comparator companies.

Annexe 2: Analysis of comparators discussed by the respondents